

Appl. No. 10/635,637
Amdt. dated May 6, 2005
Reply to Office Action of Feb. 10, 2005

Amendments to the Drawings

The attached sheet of drawings includes Fig. 4 and is intended to replace the original sheet of drawings containing Fig. 4. The previously omitted element 84 has been added to Fig. 4.

Attachment: Replacement sheet
Annotated sheet showing change

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REMARKS/ARGUMENTS

Specification

It has been noticed that in several places in the specification, the word "then" has been used instead of "than". This has been corrected in paragraphs [0035], [0037] and [0043].

Drawings

Fig. 4 of the drawings has been amended to include reference number 84 which represents the getter that the Examiner pointed out was missing in claim 26 and which is mentioned in paragraph [0112].

The Examiner also stated that the "alignment means" mentioned in claim 19 were not shown in the drawings. This claim and claim 20 have been reworded to eliminate this term.

Moreover, the Examiner stated that "a sealing component insertion means" mentioned in claim 12 were not shown in the drawings. This claim 12 and claim 13 which relates thereto have been cancelled to overcome this objection of the Examiner.

Claim Rejections - 35 USC § 103

The Examiner has rejected claims 1-8, 10-13, 19, 26 and 28-29 under 35 U.S.C. 103(a) as being unpatentable over Trentelman U.S. Patent No. 6,453,092 corresponding to WO 02/052320.

In order to more clearly define the invention claimed in claim 1 over the cited reference, this claim has been amended by indicating at the end thereof that "the optical fiber material is chosen so as to have the coefficient of thermal expansion of the strip of optical fiber not greater than the coefficient of thermal expansion of the sealing component, and the sealing component material is chosen so as to have the coefficient of thermal expansion of the sealing material not greater than the coefficient of thermal expansion of this intermediate component".

Also a further minor amendment has been made in claim 1, indicating that the housing

peripheral wall has at least one housing aperture leading into the housing inner volume. This is clearly supported by the disclosure in paragraph [0061].

This amendment now explicitly indicates that in accordance with the present invention as defined in claim 1, the following condition must prevail:

optical fiber CTE \leq sealing component CTE \leq intermediate component CTE

This is clearly supported by the disclosure as set out in paragraph [0035].

In view of this amendment to claim 1, claims 4 and 5 have been amended to specify that the sealing component CTE is greater than the optical fiber CTE and that the intermediate component CTE is greater than the sealing component CTE, rather than being "at least equal to" which is now included in claim 1.

Claim 6 which is now included in its entirety within claim 1 has been deleted.

Also, claims 2, 3 and 7 have been amended to better define the invention in view of the amendment made to claim 1.

Claims 12 and 13 have been cancelled, and claim 19 has been amended to replace the wording "further comprising an alignment means for aligning said strip of optical fiber relative to said intermediate component channel" by - - in which said strip of optical fiber is in alignment relative to said intermediate component channel-. Also, claim 20 has been amended to remove the expression "said alignment means". These corrections have been made to overcome the Examiner's objections relative to the drawings.

It is respectfully submitted that, as amended, claim 1, is not obvious in view of Trentelman.

According to MPEP 2143, the basic requirement of a *prima facie* case of obviousness is that "...the prior art reference (or references when combined) must teach or suggest all the claim limitations". Furthermore, according to MPEP 2143.01, the prior art must suggest the desirability of the claimed invention.

Claim 1, as amended does not fall within the above requirements and is therefore patentable over Trentelman.

The Examiner has acknowledged that Trentelman does not teach that the sealing component of thermal expansion is at least equal to the optical fiber coefficient of thermal

expansion and that the intermediate component coefficient of thermal expansion is at least equal to said sealing component of thermal expansion, however the Examiner considers that it is "mere matter of choice to chose the thermal expansion of different component materials in order to produce an optical packaging device". This Examiner's statement is respectfully traversed since it does not comply with the provisions of MPEP 2143 stated above.

Claim 1 of this application, as presently amended, stipulates that the relative CTEs of three specific elements need to be carefully chosen in order to produce a satisfactory sealing contact. When forming adhesive joints, it is important to avoid delamination caused by temperature induced stresses and the applicants have found that a low cost, reliable seal can be produced by carefully choosing the relative CTEs between the optical fiber, the intermediate component provided at one or both ends of the housing and having a channel through which the optical fiber passes, and the sealing component made of sealing material which is provided to seal the optical fiber within the channel of the intermediate component. As already mentioned above, this relationship should be:

optical fiber CTE \leq sealing component CTE \leq intermediate component CTE.

Nothing similar is either disclosed or suggested by Trentelman. The only reference to relationships between CTEs of various elements mentioned by Trentelman, for example, in the abstract, in column 5, lines 12 to 17, and in claim 3 of U.S. Patent No. 6,453,092 concerns the configuration of the housing where the relative CTEs are chosen between concentric tubular members 12, 18 and 24 shown in Fig. 1 and where the first and third of these members are made of materials having the same CTE which is less than the CTE of the second member 18.

This has absolutely no similarity or connection with the relative CTEs defined in Claim 1 of the present invention. There is, in Trentelman, a disclosure regarding coupling of the optical waveguide fiber 26 to the end 30 of the first tubular member 12 and the end 32 of the third tubular member 24. This is disclosed, for example, at the end of column 4, and the beginning of column 5 where it is stated that this can be done by any one of different coupling mechanisms, as follows:

"For example, glass frits may be used to secure the optical waveguide fiber 26 to the first 12 and third 24 tubular members at points A and B respectively. Alternatively, the optical

waveguide fiber 26 could be metallized and soldered to the first 12 and third 24 tubular members at points A and B respectively" (c.f. column 4, lines 61 to 66). Also, "As a further example, the optical waveguide fiber 26 could be adhesively bonded to the first 12 and third 24 tubular members at points A and B respectively. An example of an adhesive that has proven suitable is EP 62-1 available from Master Bond, Inc. of Hackensack, N.J., U.S.A. "(c.f. column 5, lines 2 to 7).

From these disclosures, it is clear that according to Trentelman the coupling of the fiber 26 to the outer tubular members 12 or 26 can be done in a number of different ways and none of these indicate that the CTE of the coupling material (frit, solder or adhesive) is important and should be adjusted relative to the fiber 26 and the coupling element A or B. In fact, nowhere in Trentelman is it indicated that the CTE of the fiber 26 is important and should be adjusted relative to the coupling material CTE or the coupling elements A and B between tubular members 12 and 24. Only the CTEs of the tubular members 12, 18 and 24 have been indicated as being important with relation to each other and there are no equivalent tubular members in the present claim 1.

The Examiner has stated at the end of page 5 and the beginning of page 6 of his Office Action that Trentelman teaches an optical component packaging device (Fig. 8, item 94) in combination with an optical component 104 optically coupled to a strip of optical fiber 169 which is made of an optical fiber material defining an optical fiber coefficient of thermal expansion (shown in at least Fig. 9, page 8, 2nd paragraph). This Examiner's statement is simply incorrect. There is no indication anywhere in Trentelman's disclosure that the coefficient of thermal expansion of the optical fiber material is important to his invention. On page 8, paragraph 2, to which the Examiner referred (column 5, lines 41 to 46 of the U.S. Patent No. 6,453,092) it is clearly indicated that "it is desirable for the temperature-compensated optical device 10 to have a coefficient of thermal expansion of -75×10^{-7} per $^{\circ}\text{C}$." The optical device 10 which is shown in Fig. 1 may well correspond to the optical device 94 shown in Fig. 8, but it certainly does not correspond to the optical fiber 169 shown in Fig. 8 (presumably the Examiner wanted to refer to Fig. 8 when he referred to optical fiber 169 since there is no such reference in Fig. 9).

Then, on page 6 of the Office Action, the Examiner refers to housing 110 (shown in Fig. 8 defining a housing peripheral wall encompassing a housing inner volume), said housing peripheral wall having a housing aperture extending therethrough and leading into said housing inner volume (shown in Fig. 8, item 110 encompassing housing inner volume has aperture/with-end-caps 112, 114 extending therethrough and leading into said housing inner volume), said housing being made of a housing material defining a housing coefficient of thermal expansion (see page 14, last parag. +).

It is submitted that in this statement, the Examiner completely misrepresented the Trentelman patent. As disclosed in column 9 which describes the embodiment of Fig. 8, (c.f. lines 21 +) the temperature-compensating package 98 includes an inner member 106, a middle member 108, and an outer member 110 and two caps 112, 114. Thus, the Trentelman housing does not consist merely of the outer member 110 as implied by the Examiner. Also, although cap 114 is at the end of outer member 114, cap 112 is at the end of inner member 106. As previously indicated, the CTEs of the three members are adjusted so that the first is equal to the third and the second is greater than the other two. It is the combination of these three tubular members that comprises the housing of Trentelman. This is totally different from the housing of the present application as set out in claim 1 which defines only one peripheral wall and is made of a material defining one coefficient of thermal expansion.

On page 6 of his Office Action, the Examiner also referred to "an intermediate component 98" in the Trentelman patent, presumably with reference to Fig. 8. It is not understood what exactly he is referring to. In column 9, lines 8-23 of the patent, it is clearly stated that reference 98 relates to the temperature-compensating package that includes an inner member 106, a middle member 108, an outer member 110 and two caps 112 and 114. Presumably, the Examiner wanted to refer to the end cap 114 which, as disclosed in paragraph 10, lines 42-45, is threaded onto an optical fiber 96 and then adhesively bonded to this optical fiber. Again, however, nothing is said by Trentelman that either the CTE of the optical fiber and of the adhesive should be selected relative to each other.

Finally, the Examiner indicated on page 7 of his Office Action that there is indication in the Trentelman patent that the sealing component between the fiber and the intermediate

component (presuming there is such a component in the Trentelman patent which is not clearly stipulated) is provided with a defined CTE. There is absolutely no such indication in Trentelman. Nowhere in Trentelman is it stated that the adhesive should have a predetermined CTE and, therefore, the Examiner's statement to that effect is simply incorrect. However, if one is to assume that the "intermediate component" in Trentelman consists of the end portion of the tubular member 12 and/or 24 or corresponding members shown in other figures, then they would be made of a material such as INVAR® which has a CTE of 15×10^{-7} per °C (c.f. column 6, lines 2-7); the epoxy adhesive EP-62-1 has a CTE of about 400×10^{-7} per °C at room temperature which has been verified with its producer; and it is known that the CTE of the SMF 28 fiber is 5×10^{-7} per °C. This would produce:

sealing component CTE > intermediate component CTE > optical fiber CTE
which is clearly different from what is claimed in claim 1 by the applicants. In any event, nowhere in Trentelman is it stated or suggested that the relative CTEs between the optical fiber, the sealing component and the intermediate component are of any significance.

It is submitted that what the Examiner has attempted to do is to find individual "features" or "elements" in the prior art, namely the Trentelman patent, and using hindsight of applicant's own disclosure, combine these feature or elements to reject applicant's own claims. This is clearly not acceptable. As the CAFC states in *W.L. Gore and Associates Inc. v. Garlock, Inc.*, 220 USPQ 303:

To imbue one of ordinary skill in the art with knowledge of the invention in suit, where no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher. (220 USPQ 312-313).

In view of the above cogent reasons, it is submitted that the new claim 1 possesses all attributes of patentability and should be allowable.

The remaining claims submitted in this application (except those that have been withdrawn due to the Examiner's decision pertaining to the election between claims 1-29 and 30-34) depend directly or indirectly from claim 1 and, therefore, should also be allowable.

Allowable Subject Matter

It is noted that the Examiner has found claims 9, 14-18, 20-25 and 27 to be allowable and these claims have been maintained.

Election Requirement

Although the Examiner has maintained the election of claims 1-29 and made it final, we respectfully request that it be reviewed by the Supervisory Examiner, since we do not agree with this Examiner's decision. For reasons which we clearly outlined in the previous response to the election requirement, we believe that this election requirement was faulty from the start. In all election requirements that the undersigned agent has received in the past, the Examiner always indicated in which different classes and/or sub-classes he would have to search for the separate groups of claims. No such indication has been made by the Examiner in the present case.

It is submitted that claims 30-34 relate to the same invention, but rather than claiming the combination of the packaging device with the optical fiber, they claim the packaging device only. There is therefore no reason whatsoever to withdraw them from the present application.

In another recent case belonging to the same assignee and issued as U.S. Patent No. 6,782,147, there is clearly no generic claim to cover claims 1, 11, 24 and 27 and in spite of this, all these claims were accepted in the same patent. It is not seen why a different interpretation of 35 U.S.C. 121 should be made in the present case.

In view of the foregoing amendments and remarks, it is respectfully submitted that the present application is now in condition for allowance and an early favorable action is accordingly solicited.

The Examiner is invited to call Applicant's agent if any questions remain following review of this response.

Respectfully submitted,



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